Ocean Color Experiment Ver. 3 (OCE3)

~ Concept Presentations~

Contamination

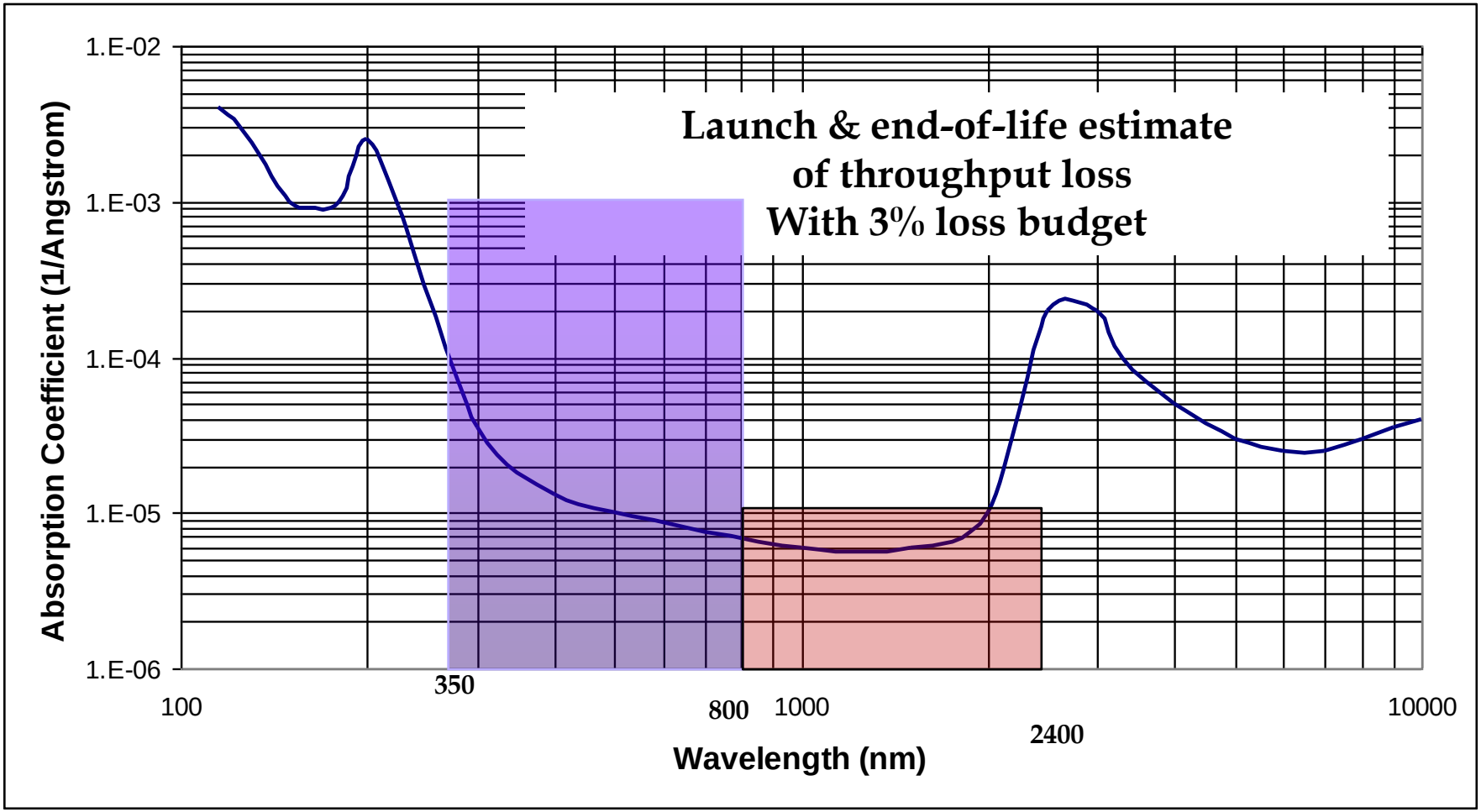
June 18, 2011

Areas of Concern Main Optics

- **Instrument Body**
  - Large number of optic surfaces
    - 51 passes through surface contamination
      - All but nine handle UVA at 350 nm
      - Many handle inferred to 2400 nm
      - One at very long angle
      - At least one in a focal plane
      - One surface chilled to -20 C
  - Readings reach into UVA at 350 nm
    - Sensitive to hydrocarbon (Next slide)
  - Compact multi-sensor design limits inter baffling

OCS3 Wavelength Sensitivity

Line: 50 ang Molecular Contamination



Areas of Concern Telescope Tube

- **Telescope Tube**
  - Interior tube coatings probably uncleanable
    - Limited access, flat black with complex surface
    - Large particles will remain into space and then can migrate
  - Telescope Launch Venting
    - Exhaust directed at rotating mirror at very flat angle
    - Could be a problem for large particles sticking
    - Fortunately, not on a focal plane
  - Rotating Telescope Tube
    - Up to 7 g simulated gravity out to ends of tube
    - Large particles may move
      - Stick to interior optical surface or mirror
      - Cut throughput
      - Fortunately, not on a focal plane

Areas of Concern Calibration

- **Cal System**
  - OCE2 version problematic
    - Mounts on cradle
    - Light leaks a major concern
  - OCE3 New Notional Design considered
    - Expand size to over to fill field of view in one dimension only
    - Move to the scanner housing to address light leak concern
    - Glare control is TBD
      - Could require additional mass

Recommendations

- **Construction in 10K cleanrooms required**
  - Standard practice for this type of instrument
    - Also use 100 clean benches for Optics Subcomponents
  - Protect against molecular contamination
    - Hydrocarbons, silicones
    - Effect UVA and diffuser plates adversely
  - Protect against large particles
    - These block throughput and increase stray light
    - Redistribution likely after launch
- **Purge System Needed**
  - Mass for parts flown estimate 2.0 kg
  - Machined components for labyrinth vent traps needed
- **Computer analyses Recommended**
  - Similar to thermal analysis featuring View Factors
    - Calculate migration paths for molecules
    - Evaluate venting design
  - Instrument has an unusual large particle considerations